

10/570,815

REMARKS

Claims 14-22 is rejected under 35 U.S.C. § 112, first paragraph, for the reasons noted in the official action. The inadequate written description rejection is acknowledged and respectfully traversed in view of the following remarks.

Claims 14-16 and 18 are rejected, under 35 U.S.C. § 103(a), as being unpatentable over Reynolds '062 (U.S. Patent No. 5,609,062) in view of Sandig '369 (U.S. Patent No. 6,334,369). The Applicant acknowledges and respectfully traverses the raised obviousness rejection in view of the above amendments and the following remarks.

Reynolds '062 relates to a compound counter shaft transmission including a main shaft 118, an output shaft 72 and a pair of secondary counter shafts 120. Each of the secondary counter shafts 120 rotationally supports a separate—not integrally formed—hollow auxiliary counter shaft section 80 by way of a first bearing 86 and an unnumbered bearing. These bearings are located at axially opposite ends of the counter shaft section 80. At one end the counter shaft 80 is supported by a bearing 86 located between the secondary counter shafts 120 and an interior surface of the hollow auxiliary counter shaft sections 80. The other end of the counter shaft section 80 is rotationally supported by bearings 126 located between the housing and an exterior surface of the counter shaft section 80.

The main shaft 118 supports a gear 74 which communicates with a gear 78 of the counter shaft sections 80. Another gear 82 supported on the counter shaft sections 80 communicates with a gear 84 fixed to the end of the output shaft 72. When the gear 72 is engaged with the main shaft 118, the main shaft 118 drives the counter shaft section 80 which drives the output shaft 72. The manner in which corresponding gears 74, 78, 82, 84 of the shafts 118, 80, 72 engage with each other is not specifically taught other than statements saying they are “constantly meshed” with each other (col. 5, Ins 9, 13; col. 6, Ins. 31, 35).

10/570,815

It is noted that the counter shaft sections 80, cited by the Examiner, are hollow cylindrically shaped sections of counter shaft 80. This design enables the secondary counter shaft 120 to pass coaxially through the counter shaft section 80.

The Applicant asserts that the claims of the application are distinct from the teachings of Reynolds '062. First, although Reynolds '062 teaches a number of different gears 74, 78, 82, 84 that engage with each other, Reynolds '062 fails to teach the manner by which these gears 74, 78, 82, 84 engage. The claims of the application include the distinction that the claimed gear wheels have helical teeth. As the Examiner is undoubtably aware, helical gears have many characteristics that are different from other more common gears. One notable characteristic is that helical gears introduce significant axial forces into the system of shafts and gears. Because of this, it is necessary in gear systems utilizing helical gears to compensate for or offset such axial forces. Reynolds '062 fails to teach any means of compensating for axial forces that would be introduced into the transmission if the gears used in the transmission were helical gears. However, Reynolds '062 does discuss, in connection with the gears, that common gear cutting and finishing equipment is used to minimize machine setup time and minimize the cost of required manufacturing and test tooling (col. 6, Ins. 64-70). As one of the stated objectives of Reynolds '062 is "to simplify and reduce the costs of tooling and machining" the transmission (col. 1, Ins. 60-61) and as it is known that the costs and the difficulty of manufacturing gear sets, which utilize helical gears, is greater than those associated with more common gears, the Applicant contends that the gears taught by Reynolds '062 are not helical gears.

A further distinction of the claims from the teachings of Reynolds '062 relates to the differences in the rotational support of the claimed counter shafts. As briefly discussed above Reynolds '062 teaches that counter shaft sections 80 are supported on one side by a first bearing 126 that is located at one end of the counter shaft sections 80 between the housing H

10/570,815

and the exterior surface of counter shaft 80. The opposite end of the counter shaft section 80 is supported by a bearing 86 that is located between the secondary counter shaft 120, which passes coaxially through the counter shaft section, and the interior surface of the hollow counter shaft section 80. In short, the counter shaft section 80 is rotatably supported by an external bearing 126 and an internal bearing 36. This is distinct from the claims of the application which include the limitation that the counter shafts 12, 14 are rotatably supported by bearings 34, 36, 38, 40 that are external to the counter shafts 12, 14.

In further distinction from the teachings of Reynolds '062, the claims of the application include limitations regarding the form of the counter shafts 12, 14. As briefly discussed above Reynolds '062 teaches counter shaft sections 80, cited by the Examiner, that are cylindrically shaped and hollow. This design of the counter shaft sections 80 is necessary for coaxially passing the secondary counter shaft 120 through the counter shaft sections 80. In distinction from the Reynolds '062 reference, and as claimed and seen in Fig. 1, the counter shafts 12, 14 each have a radially uninterrupted cross section along a plane that is coincident with the respective rotational axis of the first and the second counter shafts 12, 14. Or in other words the counter shafts are solid, at least along the cross sectional plane seen in the Fig.

Reynolds '062 clearly fails to teach gears that are helical, related counter shafts that are solid and rotationally supported by bearings located about the exterior of the counter shafts.

Sandig '369 relates to a toothed wheel unit having external toothings. In the embodiment cited by the Examiner, Fig. 14 of Sandig '369 shows spur wheels 1512, 1516, which engage each other by way of toothing 1520 and which are rotationally supported by way of bearings 1534a, 1534b. The toothing 1520 of these spur wheels 1512, 1516 is taught to likely be helical. As such each of the spur wheels 1512, 1516 includes integral pressure combs 1584a, 1584b, 1586a, 1586b which mate and axially secure the position of the spur wheel 1512, 1516 in

10/570,815

relation to each other thus compensating for the axial forces placed on the gear wheels 1512, 1516 by the helical type of toothing.

Although Sandig '369 arguably teaches elements claimed in the application, the Applicant respectfully asserts that there is no motivation to combine the teachings of Sandig '369 with those of Reynolds '062. Furthermore, the combination of Sandig '369 with the reference of Reynolds '062 still fails to teach all the distinctive limitations of the claims of the application.

Claims 17 and 19-22 are rejected, under 35 U.S.C. § 103(a), as being unpatentable over Reynolds '062 in view of Sandig '369 as applied to claims 14-16 and 18, and further view of Loeffler '493 (U.S. Patent No. 4,807,493). The Applicant acknowledges and respectfully traverses the raised obviousness rejection in view of the above amendments and the following remarks.

The Applicant acknowledges that the additional references of Loeffler '493 may arguably relate to the feature indicated by the Examiner in the official action. Nevertheless, the Applicant respectfully submits that the combination of the base reference with this additional art still fails to in any way teach, suggest or disclose the above distinguishing features of the presently claimed invention. As such, all of the raised rejections should be withdrawn at this time in view of the above amendments and remarks.

In order to emphasize the above noted distinctions between the presently claimed invention and the applied art, independent claim 14 of this application now recites the features of "each of the first and the second gear wheels (8, 10, 16, 18) having helical teeth . . . an output gear wheel (20) being integrally formed with the drive output shaft (22) and having helical teeth". Next, independent claim 20 of this application recites the features of "a first counter shaft (12) and a second counter shaft (14) each rotating about a rotational axis . . . and having a radially uninterrupted cross section along a plane that is coincident with the respective

10/570,815

rotational axis of the first and the second counter shafts (12, 14)". Independent claim 22 of this application now recites the distinctive features of "an exterior surface of the first and the second counter shafts (12, 14) is radially supported at a first axial end on a housing (30) by a first bearing (36, 40) and the exterior surface of the first and the second counter shafts (12, 14) is radially supported at a second axial end by a second bearing (34, 38)". Such features are believed to clearly and patentably distinguish the presently claimed invention from all of the art of record, including the applied art.

If any further amendment to this application is believed necessary to advance prosecution and place this case in allowable form, the Examiner is courteously solicited to contact the undersigned representative of the Applicant to discuss the same.

In view of the above amendments and remarks, it is respectfully submitted that all of the raised rejection(s) should be withdrawn at this time. If the Examiner disagrees with the Applicant's view concerning the withdrawal of the outstanding rejection(s) or applicability of the Reynolds '062, Sandig '369 and/or Loeffler '493 references, the Applicant respectfully requests the Examiner to indicate the specific passage or passages, or the drawing or drawings, which contain the necessary teaching, suggestion and/or disclosure required by case law. As such teaching, suggestion and/or disclosure is not present in the applied references, the raised rejection should be withdrawn at this time. Alternatively, if the Examiner is relying on his/her expertise in this field, the Applicant respectfully requests the Examiner to enter an affidavit substantiating the Examiner's position so that suitable contradictory evidence can be entered in this case by the Applicant.

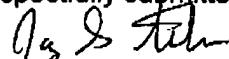
In view of the foregoing, it is respectfully submitted that the raised rejection(s) should be withdrawn and this application is now placed in a condition for allowance. Action to that end, in the form of an early Notice of Allowance, is courteously solicited by the Applicant at this time.

10/570,815

The Applicant respectfully requests that any outstanding objection(s) or requirement(s), as to the form of this application, be held in abeyance until allowable subject matter is indicated for this case.

In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,



Jay S. Franklin, Reg. No. 54,105
Customer No. 020210
Davis & Bujold, P.L.L.C.
112 Pleasant Street
Concord, NH 03301-2931
Telephone 603-226-7490
Facsimile 603-226-7499
E-mail: patent@davisandbujold.com